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A new species of *Selenosporella* and two microfungi recorded from a cloud forest in Mérida, Venezuela

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Abstract — *Selenosporella setosa,* a new anamorphic fungus collected on decaying leaves of an unidentified plant, is described and illustrated. *S. setosa* is characterized by subulate conidiophores with 1–4 verticillate, sessile setae near the apex and lunate, hyaline, one-celled conidia. *S. perramosa* comb. nov. is proposed to accommodate *Selenodriella perramosa.* A key to treated *Selenosporella* species and illustrations are provided. Two other species of anamorphic fungi are recorded and illustrated from Venezuela.

Key words — systematics, conidial fungi

Introduction

Over 35 anamorphic fungi were collected during a mycological survey of microfungi from tropical plant material in several undisturbed cloud forests in Venezuela near "Las Chorreras vía Jají, La Carbonera and San Eusebio, Estado Mérida" between 2000–2485 m alt. Among the collections was a conspicuous fungus clearly related to the genus *Selenosporella* G. Arnaud ex MacGarvie, which appears to be new to science.

Materials and methods

Samples of plant material were placed in separate paper bags and taken to the laboratory. Material was air dried for 12 h. and damp chambers were prepared in the laboratory and incubated for 4–10 days at 30º C. Leaf litter decoction agar was prepared by boiling 60g of decaying leaves in 1 L of distilled water for 30 min. The extract was supplemented with 1.3% of agar, pH adjusted to 6.0, and the agar was autoclaved for 20 min. Fungi were isolated into pure culture by transferring single conidia observed under a stereo microscope onto Petri dishes of leaf decoction agar and incubated at 25º C with 12 h alternating cycles of daylight/dark.

Mounts were prepared in polyvinyl alcohol-glycerol (8 g in 100 ml of water, plus 5 ml of glycerol) and measurements made at a magnification of × 1000. Micrographs were obtained with a Zeiss Axioskop 40 microscope and a Jeol JSM-6400 scanning electron microscope using the techniques described previously by Figueras & Guarro (1988).

Taxonomy

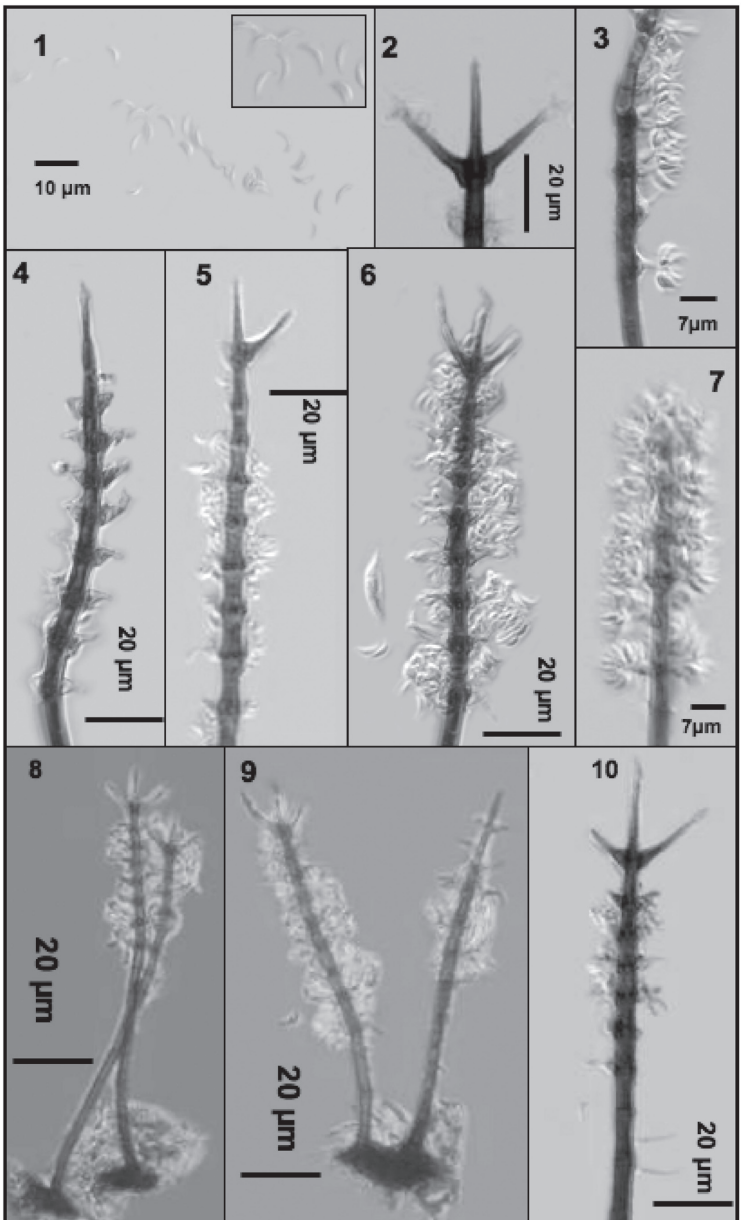
Selenosporella setosa R.F. Castañeda & B. Guerrero, **anam. sp. nov.**

MycoBank, MB 512684 Figs. 1–10, 23–24

Coloniae in substrato naturali effusae, pilosae, amphigenae, brunneae vel nigrae. Mycelium plerumque superficiale et aliquot in substrato immersum. Hyphae septatae, ramosae, laeves, brunneae, 1.0–2.5 µm diam. Setae cylindricae, ampliata ad basim, obtusae ad apicem, 0–2 septatae, 21.6–32.4 × 6.2–7.2 µm, atrobrunneae versus pallidiora ad apicem; interdum in conidiophoris mutatis. Conidiophora macronemata, mononemata, erecta, plerumque ramosa et setosa ad apicem, laevia, 120–265 × 12.5–20 µm, atrobrunnea. Cellulae conidiogenae polyblasticae, lageniformes vel subulatae, sympodiales, indeterminatae, 8–10 × 6–9(–17) µm, subhyalinae, cum denticulis inconspicuiis, 1–4 in verticilli, supra vel infra septum insertae, plerumque in septum dispositae. Conidia solitaria, lunata, utrimque acerosa, unicellularia, hyaline vel subhyalina, 4.5–5.5 × 1.2–1.8 µm, laevia, sicca.

Type: **VENEZUELA. Mérida:** Andean cloudy forest, San Eusebio, Vía Merida a la Azulita, 2435 m high, on rotten leaves of an unidentified plant, 24.VII.2008, B. Guerrero and G. M. Adamo (**HOLOTYPE**: HAL 2298 F, 2299 F slides).

Etymology: Latin, *setosa,* referring to the setae borne near the apex of conidiophores.



Figs. 1–10. *Selenosporella setosa*, photomicrographs from holotype (HAL 2298 F). Fig. 1. Conidia. Fig. 2. Apical setae. Figs. 3–10. Setose conidiophores, conidiogenous cells and conidia. Scale is indicated by bars.

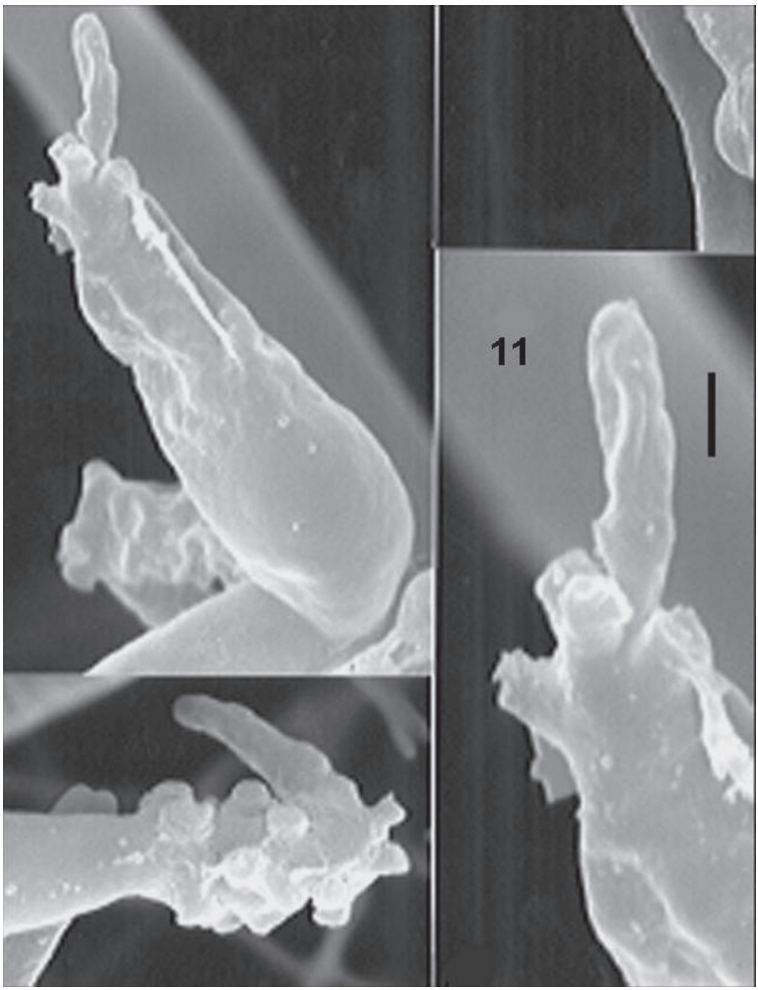
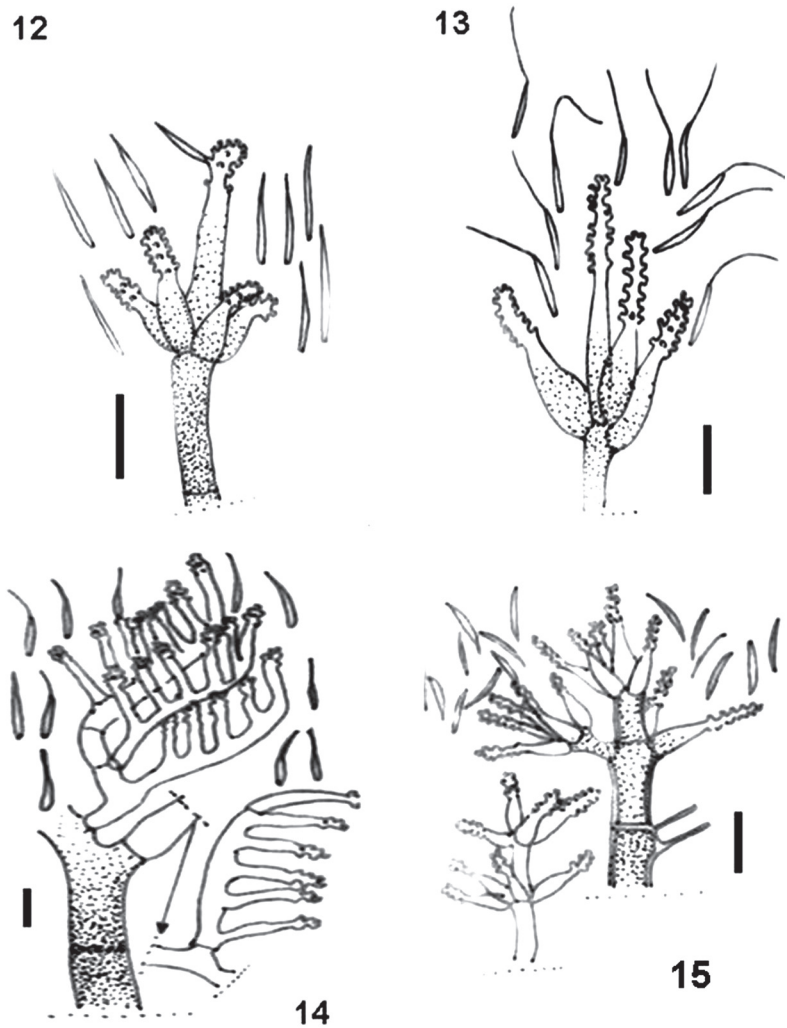


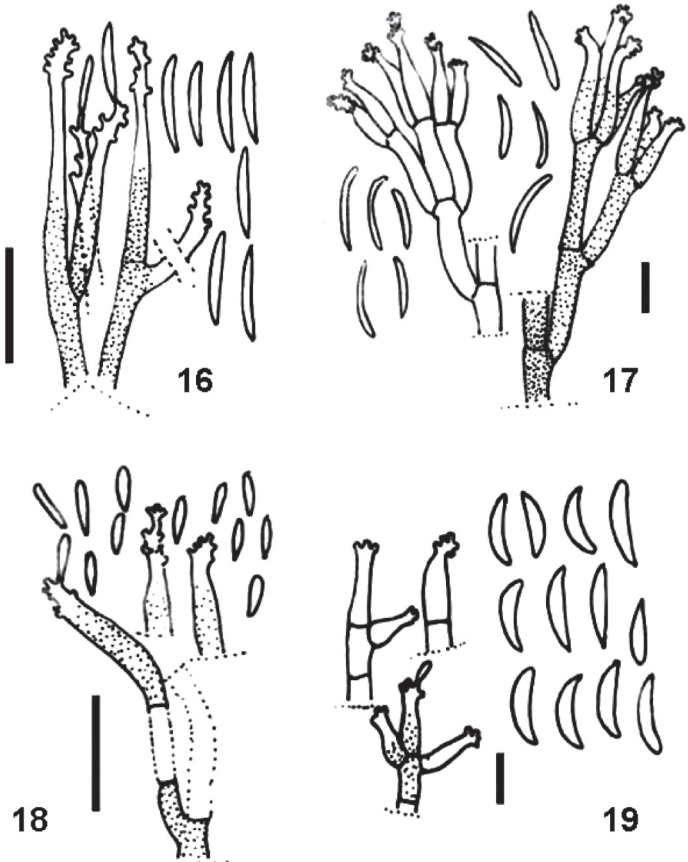
Fig.11. *Selenosporella curvispora*, photomicrographs (SEM) from culture (CBS 102623). Conidiogenous cells, denticulate loci and conidia. Bar = 1 µm.

Colonies on the natural substrate effuse, hairy, amphigenous, brown or black. Mycelium mostly superficial and somewhat immersed. Hyphae septate, branched, smooth-walled, brown, 1.0–2.5 µm. Setae cylindrical, broad at the base, obtuse towards the apex, 0–2-septate, 21.6–33.4 × 6.2–7.2 µm, dark brown versus pale brown towards the apex; sometimes developing into secondary conidiophores with apical cell producing several conidia. Conidiophores



Figs. 12–15. Conidiogenous cells and conidia of *Selenosporella* species, redrawn from the original descriptions. Fig. 12. *S. acicularis*. Fig. 13. *S. aristata*. Fig. 14. *S. conglutinata*. Fig. 15. *S. curvispora*. Bars = 10 µm.

macronematous, mononematous, erect, mostly branched and setose at apex, smooth, 120–265 × 12.5–20 µm, dark brown. Conidiogenous cells polyblastic, lageniform or subulate, sympodially proliferating, indeterminate,



Figs. 16–19. Conidiogenous cells and conidia of *Selenosporella* species, redrawn from the original descriptions. Fig. 16. *S. falcata*. Fig. 17. *S. gliocladioides.* Fig. 18. *S. cymbiformis.* Fig. 19. *S. nandiensis*. Bars = 10 µm.

with inconspicuous denticles, 1–4 verticils arranged perpendicular to the axis, inserted below or above septum. Conidia solitary, acrogenous, lunate, acerose at the ends, unicellular, hyaline or subhyaline, 4.5–5.5 × 1.2–1.8 µm, smooth-walled, dry.

Notes: ten species are recognized in the genus *Selenosporella*: *S. acicularis* B. Sutton & Hodges (Fig. 12), *S. aristata* Kuthub. & Nawawi (Fig. 13), *S. conglutinata* R.F. Castañeda (Fig. 14), *S. curvispora* G. Arnaud ex MacGarvie (Figs. 11,15), *S. cymbiformis* B. Sutton (Fig. 18), *S. falcata* B. Sutton (Fig. 16),

S. gliocladioides Helfer (Fig. 17), *S. nandiensis* B. Sutton (Fig. 19), *S. queenslandica* Matsush. (Fig. 20) and *S. verticillata* B. Sutton & Hodges (Fig. 21). *S. setosa* is close to *S. nandiensis* and *S. verticillata* in the shape of the conidia. *S. nandiensis* has conidia 10–16 × 2.5–3.5 µm and has two types of conidiophores, one bearing a single terminal conidiogenous cell, and the other with 0–4 lateral or slightly verticillated conidiogenous cells. *S. verticillata* has conidiogenous cells that are not perpendicular, larger conidia (6.0–9.0 µm) relative to *S. setosa*, and the conidia are abruptly tapered to an acute apex, but gradually tapered to an obtuse base. Setae are not present in *S. nandiensis* and *S. verticillata*.

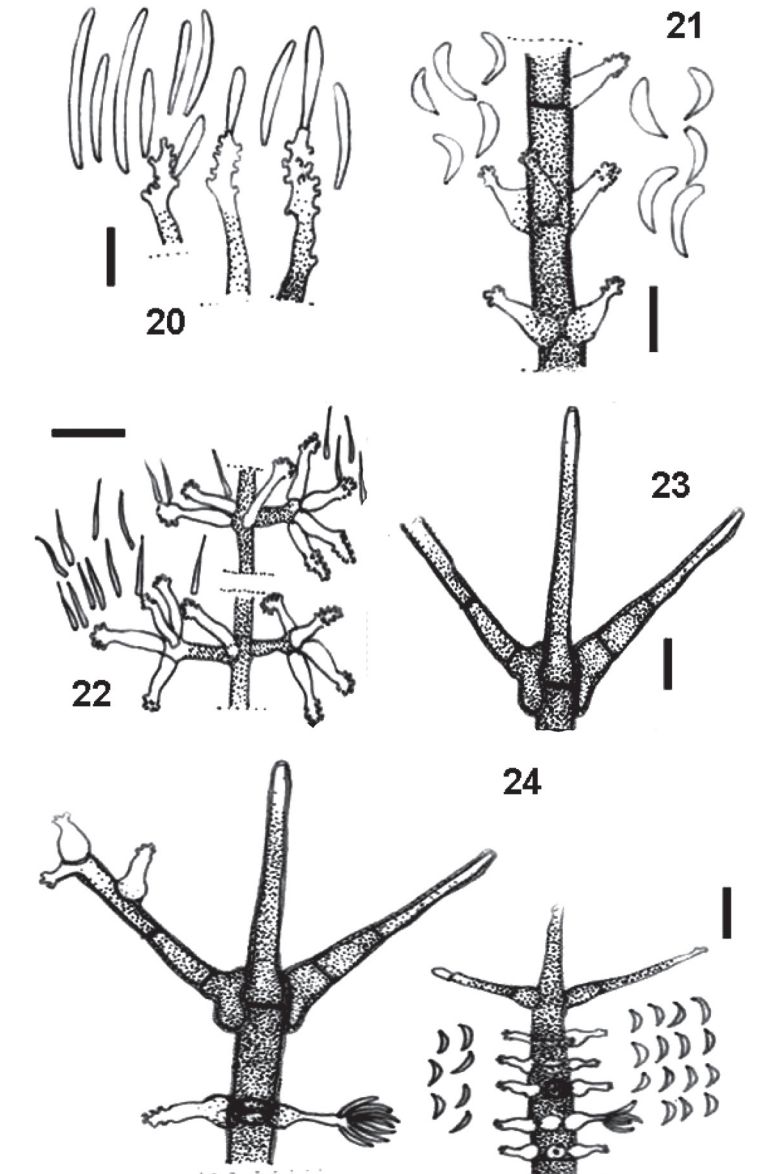
Selenosporella anamorphs and synanamorphs for ascomycetes *Oxydothis selenosporellae* and *Iodosphaeria* have been reported by Samuel & Rossman (1987) and Samuels et al. (1987) respectively, but have also been connected with *Eutypa spinosa* (Glawe & Rogers 1986) whose anamorph strongly resembles *S. gliocladioides*. Several genera of anamorphic fungi—*Acrodictys*, *Arachnophora*, *Diplococcium*, *Endophragmiella*, *Ceratosporium*, *Chaetendophragmia*, *Laterispora*, *Phialocorona*, *Porosubramaniania*, *Quadracaea, Sporidesmium,* and *Teratosperma*—have been reported with *Selenosporella*-like synanamorphs by Wang & Sutton (1998). *Sopagraha*, considered synonymous with *Arachnophora* (Kirk et al 2008) has also been reported to have a *Selenosporella* synanamorph, and other reports are for: *Endophragmiella variabilis* (Castañeda 1988); *Echinosphaeria canescens*, *Ruzenia spermoides* and *Lasiosphaeria punctata* (Miller & Huhndorf, 2004); *Spadicoides obclavata* and *S. obclavata* var. *heterocolorata* (Castañeda et al 1997); *Polytretophora calcarata* and *P. dendroidea* (Kuthubutheen & Nawawi 1991); and *Iyengarina asymmetrica* and *I. furcata* (Kuthubutheen & Nawawi 1992). All the *Selenosporella* synanamorphs are associated with taxa characterized by blastic development, and are not reported to occur in genera with thallic/arthric development. Holoblastic conidium ontogeny and denticulate conidiogenous in *Selenosporella curvispora* was confirmed using scanning electron microscopy by Onofri & Castagnola (1982.

Conidiogenous cells and branches in *Selenodriella perramosa* are disposed in verticils and inserted in the main axis and in long branches of the conidiophores as in described species of *Selenosporella.* In *Selenodriella,* conidiogenous cells are mostly sessile on the conidiophores, therefore *Selenodriella perramosa* is better accommodated in *Selenosporella*, and a new combination is proposed.

Selenosporella perramosa (W.B. Kendr. & R.F. Castañeda) R.F. Castañeda, **comb. nov.** Fig. 22

MycoBank MB 513262

Basionym: *Selenodriella perramosa* W.B. Kendr. & R.F. Castañeda, University of Waterloo Biology Series 33: 36 (1990).



Figs. 20–24. Conidiogenous cells and conidia of *Selenosporella* species, redrawn from the original descriptions. Fig. 20. *S. queenslandica*. Fig. 21. *S. verticillata*. Fig. 22. *S. perramosa*. Figs. 23–24. *S setosa*. Bars = 10 µm.

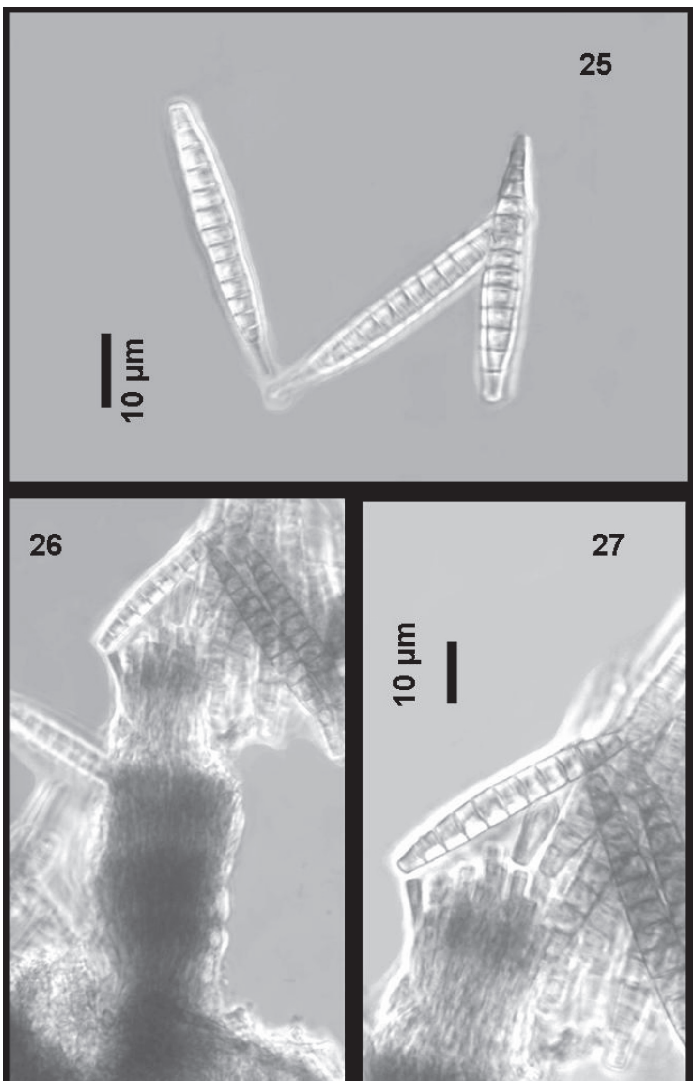
Key to *Selenosporella* species

1a. Conidiogenous cells discrete, arranged in verticils 2
1b. Conidiogenous cells integrated, not arranged in verticils 7
1c. Conidiogenous cells integrated and discrete, not arranged in verticils and slightly verticillate, two type of conidiophores usually present, the shorter one 45–92 × 3.5–4.5 µm, 2–6-septate with 0–4 conidiogenous cells slightly verticillate near the apex, the longer 160–200 × 5–6 µm, up to 11-septate with conidiogenous cell integrated, conidia fusiform, sub-lunate or falcate, rounded at the apex, tapered towards the bases, 10–16 × 2.5–3.0 µm, unicellular, hyaline . . . . . *S. nandiensis*
2a. Conidiogenous cells mostly subpenicillate, conidia cylindrical to falcate, slightly curved at the apex, 9–16 × 1.0–1.5 µm, unicellular, hyaline . . . . . *S. gliocladioides* and *Selenosporella* anamorph of *Eutypa spinosa*
2b. Conidiogenous cells not subpenicillate 3
3a. Conidia acicular or aristate 4
3b. Conidia not acicular or aristate 5
4a. Conidiogenous cells slightly verticillate at the conidiophore apex, conidia acicular, 9.5–14.5 × 1 µm, unicellular, hyaline . . . . . *S. acicularis*
4b. Conidiogenous cells verticillate many times along the conidiophore and branches, conidia acicular, 5–10 × 0.5–1.0 µm, unicellular, hyaline . *S. perramosa*
4c. Conidiogenous cells verticillate many times along the conidiophore, conidia aristate, setulose towards the apex, 18–25 × 1 µm, unicellular, hyaline *S. aristata*
5a. Setae cylindrical, broad at the base, obtuse towards the apex, 0–2-septate, 21.6–33.4 × 6.2–7.2, brown at the base, pale brown towards the apex, arising near the apex of the conidiophores, conidia lunate, acerose at the ends, unicellular, 4.5–5.5 × 1.2–1.8 µm, unicellular, hyaline or subhyaline . . . . *S. setosa*
5b. Setae or setose element arising from the conidiophores 6
6a. Conidia lunate, acute at the apex and obtuse at the base, 6–9 × 1.5 µm, unicellular, hyaline . . . . . *S. verticillata*
6b. Conidia narrowly cylindrical-botuliform, curved, 5–8 × 1.0–1.5 µm, unicellular, hyaline . . . . . *S. curvispora*
7a. Conidia cymbiform, 3.5–4.5 × 1 µm, unicellular, hyaline . . . . . *S. cymbiformis*
7b. Conidia falcate, 8.5–11.0 × 1.5 µm, unicellular, hyaline . . . . . *S. falcata*
7c. Conidia cylindrical-botuliform, curved, truncated at the base, rounded at the apex, 7.5–16× 1.0–1.5 µm, unicellular, hyaline . . . . . *S. queenslandica*
7d. Conidia acicular, straight or curved, broad and truncated at the base, 8–18×0.5 –1.0 µm, unicellular, hyaline . . . . . *S. conglutinata*

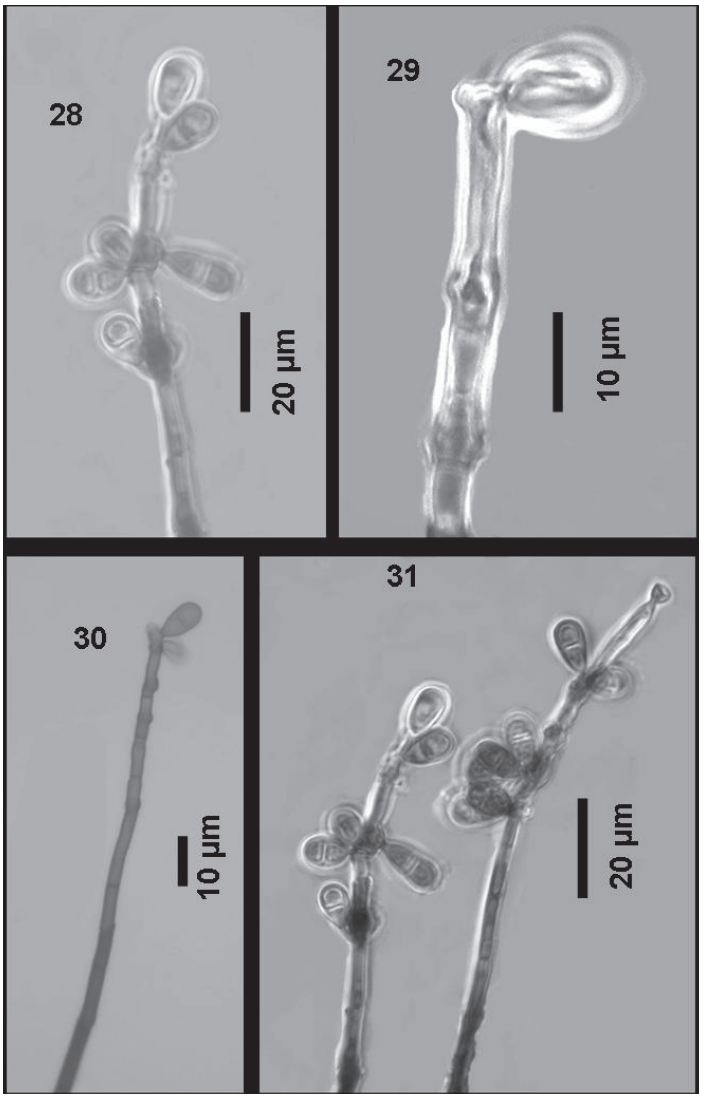
Other anamorphic fungi recorded from Venezuela, Mérida.

Bactrodesmium longisporum M.B. Ellis, 1976, More Dematiaceous Hyphomycetes, CMI., Kew, p. 68. Figs. 25–27

Specimen examined: **VENEZUELA. Mérida:** Andean cloud forest, San Eusebio, Vía Merida a la Azulita, on twig, 24.VII.2008, B. Guerrero and G. M. Adamo (INIFAT C08/15-1).



Figs. 25–27. *Bactrodesmium longisporum*, photomicrographs from (INIFAT C08/15–1). Fig. 25. Conidia. Figs. 26–27. Synnema, conidiogenous cells and conidia. Scale is indicated by bars.



Figs. 28–31. *Cordana abramovii*, photomicrographs from (INIFAT C08/15). Conidiophores, conidiogenous cells and conidia. Scale is indicated by bars.

Cordana abramovii Seman & Davydkina, 1983, Nov.Syst. Pl. non vasc. 20: 115. Figs. 28–31

Specimen examined: **VENEZUELA. Mérida:** Andean cloud forest, San Eusebio, Vía Merida a la Azulita, on twig, 24.VII.2008, B. Guerrero and G. M. Adamo (INIFAT C08/15).

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Literature cited

Castañeda Ruiz RF. 1988. Fungi Cubenses III. Instituto de Investigaciones Fundamentales en Agricultura Tropical "Alejandro de Humboldt" Havana, Cuba , 27 pp. 36 figs.

Castañeda Ruiz RF, Guarro J, Cano J. 1997. Notes on conidial fungi XII. New or interesting hyphomycetes from Cuba. Mycotaxon 63: 169–181.

Figueras MJ, Guarro J. 1988. A scanning electron microscopic study of ascoma development in *Chaetomium malaysiense*. Mycologia 80: 298–306.

Glawe DA, Rogers JD. 1986. Conidial states of some species of *Diatrypaceae* and *Xylariaceae* . Can. J. Bot. 64: 1493–1498.

Helfer W. 1991. Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici 1: 157 pp. Eching: IHW-Verlag. 1991.

Kirk PM, Cannon PF, Minter DW, Stalpers JA. 2008. Dictionary of the Fungi 10th Edition, CAB International, Oxon, UK.

Kuthubutheen AJ, Nawawi A. 1991. Two new species of *Spadicoides* from Malaysia. Mycol. Res. 95: 163–168.

Kuthubutheen AJ, Nawawi A. 1991. *Polytretophora dendroidea* sp. nov. and *P. calcarata* (Hyphomycetes) from Malaysia. Mycol. Res. 95: 623–627.

Kuthubutheen AJ, Nawawi A. 1992. New litter-inhabiting hyphomycetes from Malaysia. *Isthmophragmospora verruculosa*, *Iyengarina asymmetrica*, and *Iyengarina furcata*. Can. J. Bot. 70: 101–106..

Miller AN, Huhndorf SM. 2004. A natural classification of *Lasiosphaeria* based on nuclear LSU rDNA sequences. Mycol. Res. 108: 26–34.

Onofri S, Castagnola M. 1982. Scanning electron microscopy on some dematiaceous sympodially proliferating hyphomycetes. Mycotaxon 14: 125–139.

Samuels GJ, Rossman AY. 1987. Studies in the *Amphisphaeriaceae* (*sensu lato*): 2. *Leiosphaerella cocoes*, new combination and two new species of *Oxydothis* on palms. Mycotaxon 28: 461–472.

Samuels GJ, Müller E, Petrini O. 1987. Studies on the *Amphisphaeriaceae* (*sensu lato*): 3. New species of *Monographella* and *Pestalosphaeria* and two new genera. Mycotaxon 28: 473–499.

Wang CJK, Sutton BC. 1998. *Diplococcium hughesii* sp. nov. with *Selenosporella* synanamorph. Can. J. Bot. 76:1608–1613.